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Amendment Transmittal

Docket No. 23US

AF/1647
Btw

In re application of: Vivian F. Liu et al.

Application No.: 09/929,513

Filed: August 13, 2001

Group Art Unit: 1647

For: **METHOD FOR ANALYZING CELLULAR EVENTS**
THE ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Date: 12/13/04

I hereby certify that this is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

MS: Amendment

Commissioner for Patents
P.O. Box 1450

Alexandria, VA 22313-1450

Signed:
Vivian F. Liu

Sir:

Transmitted herewith are the following documents in the above-identified application.

- ☒ Response to Office Action;
☒ Return Postcard.

If any extension of time is needed, then this response should be considered a petition therefor.
The filing fee has been calculated as shown below:

(Col. 1)	(Col. 2)	(Col. 3)	(Col. 4)	(Col. 5)
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA
TOTAL	*10	MINUS	** 20	= 0
INDEP.	* 1	MINUS	*** 2	= 0
[] FIRST PRESENTATION OF MULTIPLE DEP. CLAIM				

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDIT. FEE		RATE	ADDIT. FEE
x \$9.00 =			x \$18.00 =	\$0
x \$42.00 =			x \$86.00 =	\$0
+ \$140.00 =			+ \$280.00 =	\$0
TOTAL ADDIT. FEE		OR	TOTAL	\$0

* If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.

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☐ Claims fee \$ _____
☒ Any additional fees associated with this paper or during the pendency of this application.

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MDS Sciex, INC.

Kevin Patrick Howard, PH.D., Reg. No.: 48,999



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By Kelvan Patrick Howard
Kelvan Patrick Howard, 48,999

PATENT
Docket No.: -23US

Docket No. 002300US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Vivian F. Liu et al.

Application No.: 09/929,513

Filed: August 13, 2001

For: **METHOD FOR ANALYZING CELLULAR
EVENTS**

Examiner: Nelson Yang

Art Unit: 1641

RESPONSE TO OFFICE
COMMUNICATION MAILED
22 September, 2004

Assistant Commissioner for Patents
Alexandria, VA 22313-1450

Examiner Yang:

In response to the Office Action mailed 09/22/04, the applicant respectfully submits the following remarks and requests reconsideration of the above-identified application.

I. Response to Claim Rejections under 35 USC 102

Claims 11-14, 16, and 18 were rejected under 35 U.S.C. 102(e) as being anticipated by Hefti in U.S. Patent No. 6,566,079. In particular, the Examiner wrote in the Office Action mailed 09/22/04: "With respect to claim 11, Hefti teaches a method comprising a sample containing structure (fig. 1A) containing a sample comprising a ligand which may be contained within a molecular binding region which is electromagnetically coupled to a portion of a signal path, where the ligand may comprise cells, cellular constituents, cell membranes, cell adhesion molecules, organelles and synthetic analogues thereof (column 6, lines 20-24, 35-40). A protein is contacted with the ligand, and a response signal is detected, indicating a binding complex formed between the protein and the ligand, where the response signal results from coupling of the propagated signal to said protein, said ligand or said complex (claim 1, column 17, line 16)." Additionally, the Examiner wrote "Hefti teaches a molecular binding region comprising cells that are coupled to the signal path where the coupling may involve a direct or indirect physical connection".

The applicant agrees with the Examiner that Hefti in U.S. 6,566,079 is detecting a signal response that indicates a binding event formed between a protein and a ligand, where the ligand may consist of cells. An examination of the specification, especially the definition of the term "binding event" in column 10, lines 7-26, sheds more light on Hefti's object of detection:

"The term "binding event" refers to an interaction or association between a minimum of two molecular structures, such as a ligand and an antiligand. The interaction may occur when the two molecular structures are in direct or indirect physical contact or when the two structures are physically separated but electromagnetically coupled therebetween."

The area of detection addressed in U.S. 6,566,079 is also discussed in the Summary of the Invention, Column 2, lines 22-35, as well as the General section of the Introduction (column 11, lines 29-33). The Summary of the Invention discussion starts with the sentence: "The present invention generally provides methods for detecting binding events between proteins and a variety of different types of ligands utilizing a system which is sensitive to the dielectric properties of molecules and binding complexes such as protein/ligand complexes."

Hefti is detecting what the applicant has termed a "molecular event". As noted in applicant's paragraph [0006.1]: "As used herein, the term "molecular event" refers to the interaction of a molecule of interest with another molecule (e.g., molecular binding) and to all structural properties of molecules of interest." Applicant's paragraph [0006.2] notes:

"Examples of molecular binding events are (1) simple, non-covalent binding, such as occurs between a ligand and its antiligand, and (2) temporary covalent bond formation, such as often occurs when an enzyme is reacting with its substrate. More specific examples of binding events of interest include, but are not limited to, ligand/receptor, antigen/antibody, enzyme/substrate, DNA/DNA, DNA/RNA, RNA/RNA, nucleic acid mismatches, complementary nucleic acids and nucleic acid/proteins."

The applicant is not claiming a method to detect a molecular event; the applicant is claiming a method to detect a cellular event, where "cellular event" is defined in paragraph [0006.4]: "The term "cellular event" refers in a similar manner to reactions and structural rearrangements occurring as a result of the activity of a living cell (which includes cell death). Examples of cellular events include opening and closing of ion channels, leakage of cell contents, passage of material across a membrane (whether by passive or active transport), activation and inactivation of cellular processes, as well as all other functions of living cells." **Molecular events involving cells are not cellular events.** The applicant, in paragraph [0008] acknowledges that ligands may consist of individual molecules or larger, organized groups of molecules such as a cell, but ligand/antiligand interactions and ligand/antiligand binding events are still molecular events. The term 'cellular event' refers not only to reactions, but to cellular living functions, structural rearrangements, and morphological changes (which often cannot be directly linked to a particular chemical reaction and which often occur down stream of a cascading series of events which may have been started by a molecular event).

Hefti, in U.S. Patent No. 6,566,079 is not detecting a cellular event; Hefti is detecting a molecular event involving the binding of a protein/ligand complex. Even when the ligand may

be a cell, a protein/ligand binding event remains a molecular event. The fact that the ligand may consist of cells is discussed in numerous places throughout the text of U.S. 6,566,079: column 6, lines 21-23, column 13, lines 43-45, column 17, lines 39-42, and claim 2, but each of those locations refers to analysis of the protein/ligand molecular binding event. No cellular event is taught. In column 14, lines 35-55, Hefti makes the object of his detection and analysis clear. Column 14, lines 42-44 notes: "This shift in frequency can be detected, and is used to indicate the occurrence of a molecular binding event."

Applicant respectfully agrees that Hefti does teach a molecular binding region comprising ligands that may be cells, but only in the context of analyzing the ability of ligands to bind to proteins, where those binding events are molecular events. Applicant's independent claim 11 is a method for detecting a cellular event, not a molecular event. Claims 12-20 depend from claim 11 and therefore also refer to cellular events. Hefti does not teach, claim, or even discuss the detection of cellular events. Applicant respectfully requests reconsideration of claims 11-14, 16, and 18.

II. Response to Claim Rejections Under 35 USC 103

Claims 17 and 20 were rejected under 35 USC 103(a) as being unpatentable over Hefti [US 6,566,079] in view of Bodner et al [US 6,461,808]. Applicant respectfully disagrees with the Examiner's statement "Hefti teaches detecting cellular events..." As discussed above, Hefti does not teach the detection of cellular events; Hefti teaches protein/ligand binding detection which is defined as a molecular event. Applicant respectfully disagrees with the examiner's statement that applicant's claims are anticipated by Hefti in view of Bodner because all of the applicant's claim limitations are not met by the combination of Hefti and Bodner et al. as discussed above.

Claims 15 and 19 were rejected under 35 USC 103(a) as being unpatentable over Hefti in view of Zang-Gandor [Zang-Gandor, Improved transfection of CHO cells, 1997, QIAGENnews, 4, 15-18]. As discussed above, Hefti does not teach the detection of cellular events. Applicant respectfully disagrees with the Examiner's statement that applicant's claims are anticipated by Hefti in view of Zang-Gandor.

The applicant respectfully requests reconsideration of claims 15, 17, 19, and 20.

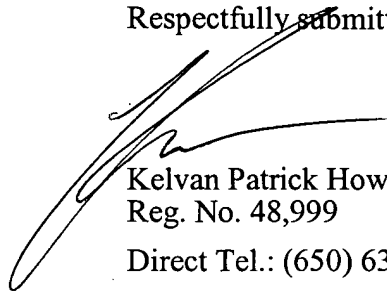
Conclusion

In view of the remarks set out above, it is submitted that this application is now ready for allowance.

If Examiner Le believes that prosecution of this application can be expedited by discussion of any issue, she is invited to telephone the undersigned at any of the numbers set out below.

Liu et al.
Serial No. 09/929,513
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Respectfully submitted,

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke, positioned above the printed name.

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